

Modern Synthesis

Module Information

2022.01, Approved

Summary Information

Module Code	6004APCHEM
Formal Module Title	Modern Synthesis
Owning School	Pharmacy & Biomolecular Sciences
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Pharmacy & Biomolecular Sciences

Learning Methods

Learning Method Type	Hours
Lecture	23
Tutorial	2
Workshop	12

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

Aims	To convey some of the most important modern chemical transformations involved in pharmaceutical, agrichemical and materials science. This will equip the learner with the theoretical knowledge that will be applied in the industrial setting.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Devise successful routes to molecules requiring several synthetic steps.
MLO2	2	Employ frontier molecular orbital theory with respect to pericyclic reactions e.g. Diels-Alder.
MLO3	3	Predict how radicals and other reactive species can be used in synthesis and ionic rearrangements.
MLO4	4	Utilise transition metal-mediated chemistry to form C-C bonds.

Module Content

Outline Syllabus	The student will be introduced to contemporary methods for organic synthesis and will learn how to plan a successful synthetic route. Including, some useful oxidation methods, such as epoxidation and dihydroxylation. Frontier molecular orbital theory with respect to pericyclic reactions e.g. Diels-Alder, and the role of reactive intermediates in organic synthesis e.g. radicals, carbenes, nitrenes, ionic rearrangements. Transition metal mediated processes (stoichiometric and catalytic): 1) homogeneous hydrogenation and asymmetric catalysis; 2) catalytic and stoichiometric oxidation reactions; 3) organopalladium intermediates synthesis e.g. Suzuki, Sonagashira, Stille, Heck cross-coupling reactions.
Module Overview	In this module you will be introduced to contemporary methods for organic synthesis and will learn how to plan a successful synthetic route. This includes useful oxidation methods such as epoxidation and dihydroxylation. Your study will be supported by workshops and problem-solving based exercise with peer-learning opportunity. This includes problems involving the correct assignment of structures, reagents, reaction conditions and mechanistic details.
Additional Information	The module will cover up-to-date methods of bond synthesis, allowing access to important molecules in terms of the materials applications covered elsewhere. This will include considerable emphasis on transition metal-mediated processes. Learning outcomes will be supported by workshops, following a problem-solving based exercise with peer-learning opportunity. This will include problems involving the correct assignment of structures, reagents, reaction conditions and mechanistic details.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO3, MLO4
Report	Report	30	0	MLO2, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Barry Nicholls	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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